

## The Claims

1. A method for encrypting highly correlated data wherein each element is compared with a previous element and:
  - 5 (a) if they are both equal, a first value is recorded;
  - (b) if they are not both equal, a second value is recorded; and
  - (c) wherein an encryption layer is added.
- 10 2. The method as claimed in claim 1, wherein adding the encryption layer comprises a pre-processing and post-processing step, the pre-processing step estimating the rate of change of the intensity and/or color in the image, and separating the image into areas of high intensity changes and low intensity changes; and the post-processing step scrambling the recorded values.
- 15 3. The method as claimed in claim 1, wherein the data is image data.
4. The method as claimed in claim 3, wherein each element is a pixel.
- 20 5. The method as claimed in claim 1, wherein the first value is a 1, and the second value is a 0.
6. The method as claimed in claim 1, wherein the first and second values are stored in a bit plane.
- 25 7. The method as claimed in claim 6, wherein for a one-dimensional compression, a single bit plane is used to store the values.
8. The method as claimed in claim 6, wherein for a two-dimensional compression, comparison is in both horizontal and vertical directions, a separate bit plane being used for each direction.
- 30 9. The method as claimed in claim 8, wherein the bit-planes for the horizontal and vertical directions are combined by binary addition to form a repetition coded compression bit-plane.
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10. The method as claimed in claim 9, wherein the combining is by binary addition, only the second values being stored for lossless reconstruction of the data.
- 5 11. The method as claimed in claim 10, wherein the result of the combining is repetition coded compression data values, all other data values being able to be reconstructed using the repetition coded compression data values, and the bit planes for the horizontal and vertical directions.
- 10 12. The method as claimed in claim 1, wherein storage in bit planes is in a matrix.
13. The method as claimed in any one of claim 1, wherein a single mathematical operation is performed for each element.
- 15 14. An encryption system for encrypting highly correlated data using repetition coded compression, the system comprising:
  - (a) a data receiver for receiving digital data;
  - (b) a reshaping block for rearranging the digital data into a matrix of data values;
  - 20 (c) a processor for receiving the matrix of data values and compressing the data values to form compressed data;
  - (d) a memory for storage of the compressed data;
  - (e) an encryption module for adding an encryption layer to mathematically manipulate the compressed data.
- 25 15. A method for encrypting data comprising:
  - (a) receiving digital data;
  - (b) reshaping the digital data into a digital data matrix;
  - (c) encoding repetitions in the digital data matrix into a bit-plane index, and stored data values; and
  - 30 (d) storing the compressed data in a storage memory in an encrypted form.
16. The method as claimed in claim 15, wherein there the bit-planes containing information regarding the repetitions along horizontal and vertical directions.

17. The method as claimed in claim 16, further including combining the horizontal and vertical bit-planes by a binary addition operation to give a repetition coded compression bit-plane.
- 5 18. The method as claimed in claim 17, further including comparing the repetition coded compression bit-plane with the digital data matrix to obtain final repetition coded compression data values.
- 10 19. The method as claimed in claim 18, further including storing and archiving the repetition coded compression data values along with the horizontal and vertical bit-planes.
- 15 20. The method as claimed in claim 15, wherein the method is used for an application selected from the group consisting of: medical image archiving, medical image transmission, database system, information technology, entertainment, communications applications, and wireless application, satellite imaging, remote sensing, and military applications.